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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/885,959	06/22/2001	Robert Gallant	06944.0037	6201

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EXAMINER

LANIER, BENJAMIN E

ART UNIT	PAPER NUMBER
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2132

DATE MAILED: 11/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/885,959	Applicant(s) GALLANT ET AL.	
	Examiner Benjamin E Lanier	Art Unit 2132	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment of claims 1, 4-6, 10, 11, and addition of claims 12-18 has been fully considered and is entered.

Response to Arguments

2. Applicant's arguments filed 30 July 2004 have been fully considered but they are not persuasive. Applicant's argument with respect to claim 4 is not persuasive because Mullin teaches representation is of the form $k_i = \sum k_i \lambda \bmod n$ where n is the number of points on the elliptic curve (Col. 7, lines 3-6, 62-64).

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1-12, 14-18 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of copending Application No. 09931013. Although the conflicting claims are not identical, they are not patentably distinct from each other because application claims a method for multiplying an

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elliptic curve point Q by selecting an elliptic curve over a finite field F, establishing a representation of said scalar k as a combination of components k_i and an integer, combining said representation and said point Q to form a composite representation of a multiple corresponding to kQ , and computing a value corresponding to said point kQ from said composite representation of kQ .

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 8, 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claims 8, 17 recites the limitation "grouped terms G_i " in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who

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has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

9. Claims 1-8, 10-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Mullin, U.S. Patent No. 5,999,626. Referring to claims 1, 5, 6, 10, 14, 16, Mullin discloses a frobenius operator (\emptyset) being applied to an elliptic curve, to generate key pairs, at least one of the coordinates representing a point in the initial set to provide a coordinate of a further point on the elliptic curve. For a curve over a finite field, there are m frobenius operators so for each value of kP stored in the initial set, m values of kP may be generated, referred to as derived values. The new value of k associated with each point can be derived from the initial relationship between P and $\emptyset P$ and the initial value of k (Col. 3, lines 47-60). The frobenius operator \emptyset operates on a point P having coordinates (x,y) on an anomalous elliptic curve in a finite field such that $\emptyset^1 P = (x^2, y^2)$. Moreover, the point $\emptyset^1 P$ is also on the curve. For each value of $\emptyset^1(kP)$, it is necessary to obtain the corresponding value of $k\emptyset(P) = \lambda P$. λ is a constant that may be evaluated ahead of time and the values of its first m powers. It will be seen therefore that new session pairs k, kP may be derived simply and efficiently from the elements of the initial set. These session pairs may be computed in real time (Col. 6, lines 10-64). Mullin further teaches representation is of

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the form $k_i = \sum k_i \lambda \bmod n$ where n is the number of points on the elliptic curve (Col. 7, lines 3-6, 62-64).

Referring to claims 2, 11, Mullin teaches each of said components k_i is shorter than said scalar k (Fig. 3).

Referring to claims 3, 12, 15, Mullin teaches components k_i are initially selected and subsequently combined to provide said scalar k (Fig. 3).

Referring to claims 4, 13, Mullin discloses that the components are selected randomly (Col. 8, lines 11-15).

Referring to claims 7, 16, Mullin discloses the value of said multiple kQ is calculated using simultaneous multiple addition (Col. 10, lines 4-6).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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12. Claims 9, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mullin, U.S. Patent No. 5,999,626, in view of Reiter, U.S. Patent No. 6,243,467. Referring to claims 9, 18, Mullin discloses a frobenius operator (\emptyset) being applied to an elliptic curve, to generate key pairs, at least one of the coordinates representing a point in the initial set to provide a coordinate of a further point on the elliptic curve. For a curve over a finite field, there are m frobenius operators so for each value of kP stored in the initial set, m values of kP may be generated, referred to as derived values. The new value of k associated with each point can be derived from the initial relationship between P and $\emptyset P$ and the initial value of k (Col. 3, lines 47-60). The frobenius operator \emptyset operates on a point P having coordinates (x,y) on an anomalous elliptic curve in a finite field such that $\emptyset^1 P = (x^2, y^2)$. Moreover, the point $\emptyset^1 P$ is also on the curve. For each value of $\emptyset^1(kP)$, it is necessary to obtain the corresponding value of $k\emptyset(P) = \lambda P$. Λ is a constant that may be evaluated ahead of time and the values of its first m powers. It will be seen therefore that new session pairs k, kP may be derived simply and efficiently from the elements of the initial set. These session pairs may be computed in real time (Col. 6, lines 10-64). Mullin further teaches representation is of the form $k_i = \sum k_i \lambda \bmod n$ where n is the number of points on the elliptic curve (Col. 7, lines 3-6, 62-64). Mullin does disclose obtaining fractions $f_0 f_1$ representative of the vector v , applying said fractions to k to obtain a vector z , calculating an efficient equivalent v' to the vector v and using components of the vector v' in the composite representation of kQ . Reiter teaches components k_i are obtained by obtained short basis vectors (U_0, U_1) of the field F , designating a vector v as (k, O) , converting v from a standard, orthogonal basis to the (U_0, U_1) basis (Col. 6, lines 24-36). Reiter further discloses an extended Euclidean algorithm to obtain fractions $f_0 f_1$ representative of the vector v , applying said fractions to k to obtain a vector

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x, calculating an efficient equivalent v' to the vector v and using components of the vector v' in the composite representation of kQ (Col. 2, lines 51-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Reiter with the system of Mullin in order to provide a method of encryption utilizing elliptic curves that is computationally efficient and effective by reducing the base expansion in non-adjacent form as taught in Reiter (Col. 5, line 4 – Col. 6, line 14).

Conclusion

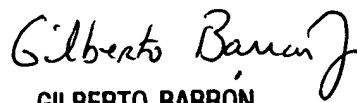
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Benjamin E Lanier whose telephone number is 571-272-3805. The examiner can normally be reached on M-Th 7:30am-5:00pm, F 7:30am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gilberto Barron can be reached on 571-272-3799. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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